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BOTH SIDES

OF THE

GRAPE QUESTION.

COMPRISING

I.

"AN ESSAY ON THE CULTURE OF THE NATIVE AND EXOTIC GRAPE."

BY WILLIAM SAUNDERS,

Of Germantown, Pa.

II.

"PHYSIOGRAPHY IN ITS APPLICATION TO GRAPE CULTURE."

BY F. J. COPE,

Of Greensburg, Pa.

III.

"A CONTRIBUTION TO THE CLASSIFICATION OF THE SPECIES AND VARIETIES OF THE GRAPE VINE, WITH HINTS ON CULTURE."

BY J. M. McMINN,

Of Williamsport, Pa

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NOTE BY THE PUBLISHER.

With the first issue of the "*Farmer and Gardener*" in September last, we offered a number of premiums for Essays on various subjects. Among them was a handsome one for the "Best Essay on the Grape." For reasons which we cannot explain, there was little or no competition. In February last, we renewed the offer, with more satisfactory results. Seven ably written essays were received, which, in accordance with our previously published arrangements, were placed in the hands of a Committee composed of Dr. J. K. Eshleman, of Downingtown, Pa., Thomas M. Harvey, of Jennerville, Pa., and Jos. H. Satterthwaite, of Oxford Valley, Pa. The names of the writers of the essays were, of course, withheld from the Committee. After a careful examination, the premium was awarded to the one presented by William Saunders.

The freshness and novelty of the views contained in the essay prepared by F. J. Cope, and the research displayed in the one presented by J. M. M'Minn, induced the committee to suggest the propriety of issuing the three essays in book form. With this suggestion we have most cheerfully complied, believing that the practical ideas of Mr. Saunders, the new, and certainly most beautifully presented theory of Mr. Cope, and the able "Contribution to the Classification of the Species and Varieties of the Grape Vine," by Mr. M'Minn, will form no small addition to the horticultural literature of the day.

A. M. SPANGLER.

Farmer and Gardener Office,
Philadelphia, May 15, 1860.

CULTURE

OF THE

NATIVE AND EXOTIC GRAPE.

There is, perhaps, no vegetable production that has conduced so much to the gratification and enjoyment of man as the Grape. Its rapidity of growth and longevity—its great fertility, and the varied purposes to which its delicious fruit are applicable, all combine to render it one of the most valuable, as it is one of the most available, fruit-producing plants which we possess. The facility with which it will grow, even under conditions not the most favorable, renders it available where no other equally useful plant could be cultivated; thus those who have not more than a square yard of ground may plant a grape, and train its branches on the walls of their dwelling. Of late years, the improvement of varieties, as well as the cultivation of native grapes has received great attention. Many new varieties of more or less merit have been introduced, some have proved to be very superior table grapes, and it is probable that at no distant period a wine grape may be introduced of greater value than any of those at present largely cultivated for this purpose.

The foreign grapes have also received marked attention, and as the simplicity of their management becomes more generally understood, we may expect to find at least a cold grapery as one of the first accompaniments to all suburban residences, and farmers will find that no improvement will sooner give an appreciable realization than one of these structures. The cost of glass houses suitable for their growth, from improved methods of construction, can be kept to such economical limits, that no one need be deterred from the outlay, and no investment in fruit-growing will sooner be repaid.

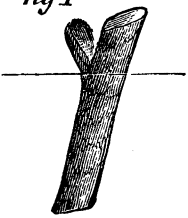
The general culture of the native grapes differs so very materially, in many points, from that of the foreign sorts, that they must be treated separately.

NATIVE GRAPES.

PROPAGATION.—*By Eyes.*—An eye, as here understood, is a portion of a branch having only one bud, and is one of the best methods of increasing both the native and the foreign grape. Plants so produced are furnished with roots near the surface of the soil, which is very important to their future growth, as they will start stronger and grow more luxuriantly when properly planted in their permanent locations. The advantages of having healthy roots near the surface, to start with, is well-known.

It is necessary, however, to ensure success by this method, that the cuttings be grown under glass, (either a greenhouse or glazed frame,) where the requisite moisture may most readily be maintained during the root-forming process. The most convenient mode is to plant in shallow portable boxes, or large flower pot saucers. The bottoms should be perforated with holes to allow free escape of water. A layer, two inches thick, of broken oyster shells, bricks, or any similar material for drainage is first spread in the bottom, a sprinkling of moss is then put over it to prevent the soil from being washed down; four inches of light sandy soil will be sufficient. The top half inch may be clean washed sand; it requires to be pressed quite firm. The eye-cuttings are inserted in rows two inches apart and about one inch apart in the row; if to be potted after rooting, they may be set thicker. The mode of preparing the eye and the depth it should be planted are shown at Fig. 1. This style of preparing the eye we have found perfectly satisfactory, and it is much more simple than some modes which recommend splitting the shoot, sharpening the points, &c.

fig 1



Thus prepared, the box may be set above the fire in the greenhouse; or, if in a frame, a portion of fresh manure should first be put in, so as to produce a slight heat. A depth of two feet will be sufficient, and if made quite firm by tramping well when filling, it will preserve warmth for several weeks; two or three inches of soil should lie spread on the surface, on which the boxes are set. During cold nights, a covering of straw will be necessary, but in bright days the sashes should be tilted both at top and bottom, so that rotting may be prevented. The soil in which the eyes are inserted must be watered with care; it is safer to keep it rather dry than otherwise, as the eye is likely to decay when kept constantly wet.

The first roots run a great distance before showing lateral fibres. In this respect the native grapes differ from most of the foreign sorts, as they throw out more fibrous roots at once, and are in consequence easier managed. With very choice or new kinds, it is safest to pot them separately in small pots when the roots are grown about one inch; we frequently pot, even before roots are formed, and prefer doing so just after the eyes have well calloused over, but they require to be set in warmth after potting, to start the roots more effectually.

If not potted, they remain in the boxes until the planting out season arrives, which is from middle to end of May. Select soil that has been well manured and deeply worked. Press the sides from the box and carefully disintegrate the roots; set out in rows two feet apart, allowing a foot from plant to plant. Give a good watering in the rows immediately when planted, and should the weather prove dry and clear at the time, insert a few branches of cedar or pine in front of the rows; this additional care will be more than repaid in the greater certainty of immediate healthy growth. If carefully cultivated and kept clean during summer, they will make good plants the first season, superior to a two year's growth from cuttings set in the open air, as usually practiced.

By Cuttings.—This is the usual way of increasing native grapes. A cutting is a piece of young wood from four to six inches in length, and having from two to four eyes or buds; perfectly matured wood only should be chosen. It is prepared by cutting a clean section close below the lowest bud, and leaving a half inch of wood above the uppermost bud. This is a necessary precaution as it prevents the bud from injury by the shrivelling that results from exposure. A light sandy soil is generally preferred for planting, but we have been most successful in a soil of a rather adhesive nature, probably in consequence of its preserving moisture better in dry weather. To prepare a strong soil it is advisable to throw it up in rough ridges before winter, the frost will render it friable by spring; the ridges are then levelled, and when dry, turn it over with a digging fork, breaking all lumps, and forming a level and finely pulverized surface. By no means work or tramp such a soil when wet. The cuttings are set in holes made with a suitable stick, and the soil pressed firmly about them with the feet. They will not root well unless the soil is firm about them. If the summer should prove very dry and parching, it will be requisite either to water, or pinch back the shoots; we prefer the last, and when the shoots have four or five leaves we pinch all except two; this lessens the evaporating surface and relieves the roots. Where a supply of water is convenient, a heavy soaking once a week, in the absence of rain, will keep them vigorous.

The young plants are liable to be drawn out by the winter frosts, especially on wet soils. A covering of manure, chips, tanbark, charcoal dust, or sand will tend to preserve them from injury.

From Seed.—New and improved varieties are produced from seed. The seeds should be planted as soon as gathered; if kept dry until spring many of them will not vegetate until the following season. We have seeds sprouting now (February) that were planted in October, 1858. They have been in the greenhouse during the whole of that time; plants from the same box having made a growth of two feet last year.

A box or large flower pot should be filled with soil and the seeds planted as they ripen. Keep in a cool place; a slight freezing will do them no harm, but rather be beneficial; place them in a greenhouse or frame early in spring, or if no such conveniences are available, sow in drills, in the open ground, the same as peas, and cover with half an inch of sand. They should be frequently hoed to keep down weeds and let air to the roots; a slight mulching with short manure will tend to preserve luxuriance during dry weather. They should be protected the first winter by covering, afterwards no such care will be essentially necessary. To get a fruiting cane as soon as possible, cut them down to two buds at the winter pruning, and train up one shoot only the following year, which treatment will, in good soil, furnish a fruiting shoot the third season from planting the seed.

By Layers.—Layering is a method of propagating, whereby roots are encouraged on a branch previous to its removal from the parent tree, and is usually adopted with plants that do not increase readily from cuttings.

Although the grape cannot be classed among difficult rooting plants, yet layering may be usefully practiced where strong rooted plants are desired. A branch is laid on the surface of the ground, pegged down, and covered with a couple of inches of soil, or a shallow trench may be prepared, and the shoot laid so that the laterals, or small branches may show above ground. Any time during early summer will allow a plentiful growth of roots. In the fall it is taken up and cut in pieces, taking notice that every piece has a bud as well as roots.

By Grafting.—When it is desired to test new varieties at the earliest possible period, it is accomplished by grafting the scion upon an old established stock. Vines of inferior sorts, if healthy, may be grafted with superior; again, some grapes, as the Delaware, do not root very readily from cuttings; these can be grafted upon stocks of easily increased vines as the Clinton, which makes a very suitable stock. A good plant is in this way made from each bud.

The operation of grafting the grape is exceedingly simple. The stock is cut over quite close to the ground, and split down the centre, the scion is prepared by cutting one end to a thin wedge, and inserted in the split of the stock, the two barks are placed in exact contact and tied with a small twine of worsted; the soil is now drawn up so as to completely cover the whole except the top bud of the scion. The best time to graft the grape is after the stock has commenced growth, but it has been done as successfully in the month of March. When growth commences in spring, the sap flows too freely from the wounded stock, destroying the graft, but when the leaves are formed before cutting down, bleeding is not so destructive.

Soil.—Calcareous and silicious soils are preferred for vineyard culture, but any good soil that will grow corn will be suitable. Even clayey soils, if properly drained and cultivated, will grow grapes. Draining, and the ameliorating effects of culture will go far to compensate for defective soil, and among the increasing variety of native grapes there are robust kinds that will succeed, perfectly, where others of more delicate constitution will fail. Thus the Concord will ripen fruit in a soil where the Catawba would uselessly rot.

Of whatever nature the soil may be, it will be much improved by deep working. Trenching with the spade is the most effective mode, but in large areas, the subsoil plough will do the work cheaper, although not so thoroughly. The ground should be ploughed twice over in opposite directions, the subsoil plough following in each furrow of the common plough both ways. This stirring of the soil will render it permeable to the roots, and admit a supply of air and moisture conducive to their growth.

Where the subsoil is tenacious, draining will be indispensable. The drains should be sufficiently close together to dry the soil quickly, and at least two and a half feet in depth, and where no natural outlet can readily be secured, (which rarely happens,) a well may be dug, and the drains run into it; if a sandy, gravelly, or shaly bottom is met, it will absorb the drainage of several acres.

It has been strenuously advised, in the operation of trenching soil, not to bring any of the subsoil to the surface; this is simply subsoiling and is only half doing a very important operation in the fundamental preparation of soil for permanent crops. It is but of temporary benefit to stir a strong subsoil unless something is put into it to keep it open, and, (if we except the mere gravels or sandy subsoils,) they are rich in the mineral ingredients required by crops, and the best means of liberating these mineral bases is by exposure to the decomposing influences of the atmosphere. The deeper the roots can ramify in good soil, the greater the crop, and it is only by enlarging the depth that plants will grow luxuriantly in dry seasons. The only way to attain this is to trench, trench, trench, and gradually bring to the surface a portion of the subsoil, that it may be enriched, and in turn give place to another layer which will undergo the same process. It is true, that in this as in other cultural operations, a knowledge of the subject is requisite to discriminate in the proper trenching of various soils. No person who has any knowledge of the relation that exists between the soil and the roots of plants would turn eighteen inches of a brick clay over upon a stratum of surface soil only four inches in thickness, and it is worse than folly in those who have been the victims of their own awkwardness, to condemn a system which they do not understand.

Planting.—Whether the plants should be one or two years old at planting, will depend very much upon the treatment they have received. If they have been raised from eyes, and carefully cultivated as recommended, they will be much superior in one year to those raised from cuttings, as usually seen, after the second year's growth. There is nothing to be gained by setting out older plants, unless all the roots are secured. A large plant with few roots is but little better than a cutting, and will require to be cut down to a few buds. We prefer one year old plants, and prune them down to two buds, when set out.

A vigorous start, enabling the plants to form a good supply of roots previous to hot or dry weather, is very important; a few shovelfuls of light, rich soil, placed near the roots at planting, will encourage the growth; mould from the woods, mixed with rotten stable manure, will form a good rooting medium.

All things considered, spring will generally be found the most suitable season to plant. But if the soil is thoroughly prepared, the end of October will be a fitting time, and may be preferred on high lands, as the roots will be well settled, and closely surrounded by the moist earth, ready to push at the first approach of growing weather. When planted in the fall, they should be headed down at once, and the soil drawn up so as to cover the plant, removing it before growth in spring.

When the plants commence growth, rub off all the buds except the strongest, and tie the shoot securely as it lengthens. It is by far the best treatment to allow every leaf and lateral shoot to grow undisturbed the first summer; to encourage and secure a healthy root foundation, therefore, no summer trimming will be advantageous. Hoeing, or cultivating occasionally during summer, will be followed by increased growth, and a coating of manure should be laid over the roots in the fall, both as a protection to the plant, and a means of enriching the soil. At the winter pruning, the plants should be again cut down to three buds; and here it may be as well to remark that we prefer to prune grapes early in November, as we have found the buds to shoot more vigorous in spring when pruned shortly after the leaves have fallen, than when the operation has been deferred until February. This results from the continued accumulation of sap in the plant during winter, and as the greatest accumulation of matter is found in the extreme buds and at the farthest point of branches, it follows that, if pruning is deferred until spring, much of the winter accumulated vigor is lost, and the buds that are retained will make a feeble start and comparative late growth. On the other hand, when pruning is performed in November, the extent of branches is reduced, and the buds that are left will swell out and start vigorously when the growing period arrives; a matter of much importance with grapes like the Catawba, which require a long season for perfection. Observation directed to this subject will lead to a conviction of its paramount importance.

The growth of the second year may be confined to one or two shoots, conformable to the system intended to be adopted in training, and the strength of the plants. Weak plants should be confined to one shoot, and as laterals appear, they should be checked by pinching out their points, when they have made two leaves. The leading or main shoot, if growing very vigorously, should be similarly checked when grown about four feet. This practice will cause full development of the lower buds, and render them fruitful to the base.

The neatest training arrangement, where grapes for table use only are desired, is the trellis. A strong, permanent trellis is made by planting chesnut or cedar posts, and boring holes through them, the holes being about fourteen inches apart, into which wires are drawn; a board six or eight inches wide is nailed on the top of the posts, keeping them in place; this kind of trellis is simple in construction, and easily repaired when necessary. For trellis training, two shoots are brought up and allowed to grow their full length, pinching out the side laterals as before advised. If they show a vigorous growth, the points may be pinched off when about five feet long, in order to throw strength into the lower eyes. No definite time can be given when such pinching should be performed, further than will be dictated by the growth.

At the winter pruning, these shoots are each shortened to four or five feet in length, and tied down horizontally, in opposite directions, to the bottom wire. The buds will all form shoots, when growth commences, and are tied up to the wires, selecting the best, at distances from fifteen to eighteen inches apart, removing all others. These will probably all show fruit bunches. Allow each alternate shoot to fruit, and remove it from the others; the non-fruiting shoots are allowed to extend, the laterals and points being pinched as recommended for the previous year. At the winter pruning, the shoots that fruited are cut down to one or two buds, the other pruned to six or eight feet lengths, according to strength of shoot and height of trellis. This method of renewal provides a cane of young wood for fruiting, alternating with a fruit-bearing shoot. In short, the treatment is similar to that of a raspberry bush; the canes being cut down after one years' bearing. The only difference in the procedure is, that, while the raspberry produces its new shoots directly from the crown of roots, the grape must be trained at first with arms turned right and left close to the ground, to form a base whence all the future shoots arise, replacing each other in alternate succession.

The number of upright canes to each plant will of course depend upon the distance apart that the vines are planted; at ten feet apart, six upright shoots can be trained;

The summer treatment of bearing plants will consist in thinning the bunches, not allowing more than two bunches at most to remain on a shoot. The shoots should be shortened to four joints or leaves beyond the bunch, when the berries are as large as peas, and all lateral and secondary growths constantly pinched back to one joint beyond their point of emission, until the end of July, when no further removal of foliage should be allowed. The extreme points of bunches should be cut out early in the season, causing a more uniform maturity of the bunch. This much for the fruiting cane. The young shoots that are trained up between the fruit-bearing branches should have all their laterals trimmed to one or two leaves, and kept at that during growth; when the shoot reaches the top of the trellis take out the point to strengthen the lower buds. Always commence at the highest branches first, in summer pruning, as they grow strongest, and by checking their growth the lower and more feeble branches will be encouraged.

Diseases.—The grape properly cultivated is not much subject to disease. Mildew on the leaves is the most injurious, as it retards growth, and the wood not being thoroughly matured in consequence, it is liable to suffer from early frosts. Syringing the leaves with soapsuds, or a mixture of lime and sulphur water will prevent its appearance or arrest its progress.

Rot.—This disease is frequently seen in the Catawba, and proceeds from wet soil, where the roots are cold. Its appearance will be noticed after a soaking rain, if followed with warm weather and bright sunshine. The remedy is to drain the ground, which will warm the soil. A grape soil should never be wet, neither should it ever become dry. Draining secures both conditions, and when the soil is kept in that state, diseases seldom occur.

Keeping the Fruit.—Various methods have been resorted to, in order to keep the fruit during at least, a portion of the winter months, and with varying success. The grapes should be gathered rather before being fully ripe than later; choosing a dry day, collect them carefully and spread them thinly on the floor of a dry, cool room. Before storing, the branches must be carefully inspected and all mouldy, rotten and imperfect berries removed. They may then be packed in clean dry boxes, in layers of wadding alternating with layers of grapes. They require to be kept as cool as possible without freezing, and damp must be excluded. The wadding is sometimes substituted by bran or oats, and baked saw dust has been used advantageously. Some kinds, the Clinton for instance, can be kept in drawers for many weeks in a cool dry room, without any intervening material.

Descriptive List of Native Grapes.—Catawba and Isabella are old well-known kinds, and have long stood as best for general planting, and when thoroughly ripened, will compare favorably with the best of newest varieties. The Catawba requires a warm fall to ripen properly in open exposures in the neighborhood of Philadelphia. Either of these grapes, with the roots in favorable soil, and the vines trained south side of a wall or close fence, will acquire a perfection in ripening equal to any hardy grape yet grown.

Diana.—This is understood to be a seedling from the Catawba, and is like its parent in color of fruit, although neither bunch nor berry are so large. It ripens two weeks earlier, and is of a rich, spicy flavor. A good grower, and valuable grape.

Delaware.—No grape has been ushered in with so many eulogiums as this. Most persons who have tested it are willing to admit that it is sweet, and pleasant to eat. It grows with tolerable vigor, and is not perhaps more subject to mildew than some others, but it is small and insignificant both in bunch and berry, and the seeds are large. It is very prolific, and will ripen a great number of bunches, although not any greater weight of fruit than the Isabella. We may risk something in remarking that we consider it has been overrated.

Concord.—We unhesitatingly place this grape in the first of the list for the million. It will grow and bear abundantly where the Catawba and Isabella will be destroyed by rot or mildew. It has a rank and robust growth, ripens its shoots perfectly, even under unfavorable conditions, consequently will stand hard freezing without injury. It is remarkably productive and ripens early. Bunch quite as large as Isabella, fruit luscious and somewhat buttery.

Hartford Prolific.—This is a good grape. Its greatest merit being its earliness. It is about equal to Isabella in flavor, and is a good substitute where the Isabella will not ripen.

Clara.—Although this is a seedling from a foreign grape, it is classified by the Pennsylvania Horticultural Society, among hardy varieties. It has ripened well in the open air in sheltered positions, but as many of the foreign grapes will do so, we would advise its general adoption with caution. If it proves perfectly reliable, it will be an acquisition, as it is a white grape of excellent quality.

Rebecca.—A very fine white grape, but of weak and slender growth, much liable to mildew, at least when young. We are unwilling to discard it, hoping that it will improve as the plants attain age and vigor. Bunch and berry of only medium size, when ripe very sweet and melting.

Clinton.—A remarkably vigorous growing plant, fruit rather small and of secondary quality for table use, but has very desirable keeping qualities, and expected, by those who have experience, to be a good wine grape.

Maxatawny.—A white grape of recent introduction, which we perhaps cannot better describe than as a white Isabella. Both bunch and berry, as well as flavor, are remarkably similar to that well-known variety.

Wilmington.—A white grape, which we learn from what we consider reliable authority, to be of best quality in every respect.

Bullitt or Taylor Grape.—We are inclined to believe, from what we have learned that this is also likely to be a reliable fruit, but cannot recommend it from personal knowledge. It is of a white color.

This is not a tenth of the list of native grapes that are now catalogued, but we consider that it embraces those of most merit so far as they have been sufficiently tested.

EXOTIC GRAPES.

The exotic grape is increased and propagated similar to the native, and generally roots much more easily. Having entered minutely into the details of propagating in the former paper, it will not be necessary to recapitulate what has already been remarked on that point.

They are almost invariably raised from single eyes, as they form the best plants, and where a few only are desired, or where there is ample room, the eyes may be placed singly in small pots at once, saving the risk of removal from the cutting boxes and economising labor. They will grow if merely set in a warm greenhouse or frame, and will root speedier if set on a slight bottom heat.

All attempts to cultivate exotic grapes in the open air in this climate may be said to have proved complete failures. Occasionally, in sheltered, and otherwise peculiarly favored situations, partial success has been obtained. We have seen good fruit of Hamburgs and others from walls in the open air; but no permancy can be relied upon them for general culture, from their tendency to be attacked by mildew both on the leaves and fruit, which prevents the young wood from maturing. The consequence is, that it will be destroyed during winter, and even although protected from frost, a diseased, weak growth ensues, which sooner or later ends in complete dissolution.

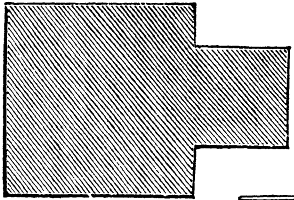
It is therefore a necessity to provide glass structures to grow them to perfection. The great desideratum is to secure the means of keeping a moist atmosphere, and to guard against sudden and extreme changes. A mere close shed with a glass roof will secure these conditions, but a slight additional outlay in the way of greater permanency or ornament, will be more than repaid in the increased interest that will be taken in a sightly structure.

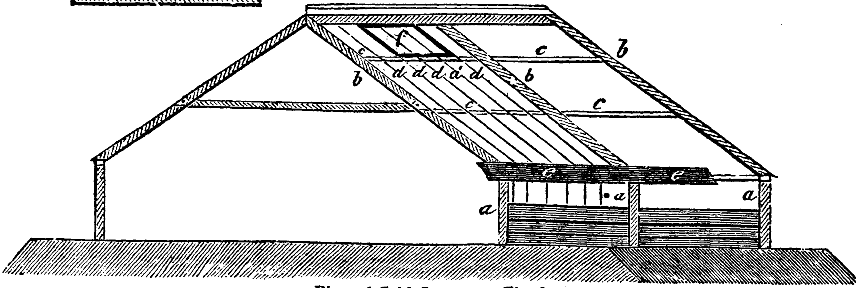
COLD GRAPERIES.

Span, or double-roofed houses are most economical for a cold grapery, as they cost less in comparison to their capacity. A degree of architectural character may be given which will render a grapery admissible in the most finished pleasure grounds. Some persons prefer curved roofs. They cost a little more than straight roofs, and many beautiful graperies have been put up in that style, but do not possess any important advantages over straight roofs.

Of late years much has been done to reduce the cost of glass structures. When finished with sliding sashes they are expensive ; with the roof fixed, and hinged ventilators, they can be put up at half the cost of the framed sash roof, they look much neater and are better adapted to the purposes of fruit-growing, because they are lighter, and do not throw so much shade in the interior ; for, although shade is at times necessary, there are seasons when all the light than can be had is desirable, and in a house with numerous heavy rafters, a permanent shade is produced.

Building the House.—A good cold grapery may be built as follows. Suppose it to be twenty-four feet wide, double-roofed and of any length from twenty to two hundred feet. Having first resolved upon the ground level of the border (which will be further alluded to), mark out the site and set locust or cedar posts seven feet apart all round; the house should be placed with end to south if convenient, although it will answer equally well if the end is placed to face any point from southeast to southwest. The north end may be boarded unless the house is in a conspicuous position. The posts are levelled at four feet from the ground surface, and a three inch by six inch sill laid on and firmly spiked into them. Rafters three inch by five inch are set up, one over each post; these are tied together with cross ties in the ordinary mode of roofing. The height at ridge, for a house of this width and front elevation will be about twelve feet from the level of sill. Cross pieces or bars made of strips of inch board three inches wide, are let in between the rafters edgeways, so that their upper surface is level with surface of rafter; these cross bars run the whole length of the house in parallel rows about four inches apart. We now have a self-supporting frame work and all that is necessary is to cover it with glass. This is a simple operation; sash bars one inch wide and one and a-half inch in depth rebated for glazing, are laid on the roof, and secured at such distance apart as may be suited to the size of glass to be used. 10 × 12 glass is a convenient size, so that the sash bars will require to be twelve and a-half inches apart from centre to centre; the rebate in the sash bar is half an inch deep and quarter of an inch on each side, leaving fig 3





Plan of Cold Grapery. Fig. 2.

a stile half inch wide. Ventilators are provided at top, hinged on the ridge. These should not be less than two feet wide, and three feet in length, and alternate on each side of roof so as to present a ventilating capacity of three feet, the whole length of the house. These ventilators are worked by upright rods from the interior. The following illustrations may render this description more intelligible.

Fig. 2, shows a portion of the roof, as also the section of the house; *a, a, a,* are the posts upon which the house rests, and *b, b, b,* are rafters; *c, c,* are the cross pieces inserted between the rafters to support the sash bars *d, d, d, d, d,* a full sized section of which is shown at *Fig.* 3.

e, is an inch board which the sash bars butt against, and the glass laps over at the bottom. This board projects to form an eave; *f,* is the position of ventilators and *g* is the cross tie. The glass is bedded in putty, and none otherwise used; outside putty is a nuisance on a glass roof. All the woodwork inside, except the sash bars, we prefer to levae unplaned. We have found that an annual coat of wash made of sulphur and lime, in proportions of one pound of the former to one peck of the latter, on all inside wood-work, is an entire preventive of insects and mildew. We therefore prefer rough surfaces for this purpose.

To form a trellis under the roof, strong wire staples, fourteen inches long, are inserted in parallel rows, fourteen or sixteen inches apart, in the rafters; No. 16 wire is then run through eyes, drawn tightly and fastened at both ends.

Soil and Border.—It is customary in making a border of soil for exotic grape growing, to excavate the subsoil and remove it to a depth of at least two feet, so as to secure that depth of good soil. Instead of removing the subsoil, we prefer to place the additional soil required on the surface, thus forming a slightly raised terrace, which adds to the beauty of the house, secures perfect drainage, and avoids the expense of removal of subsoil. To prepare a border in the best manner, first surround it on all sides by a drain, then, if the subsoil is clayey or wet, form cross drains, ten feet apart, communicating at each end with the surrounding drain first mentioned. The tops of these drains need only be a few inches below the level of subsoil. Now commence at one end of the intended border, and take out a trench three feet in width, removing it to the opposite end; remove the good surface soil only; a few inches of the subsoil may go with it unless it is a strong clay. When this trench is cleanly and evenly taken out, lay in the bottom, six inches in thickness of oyster shells, for drainage, spread regularly over the whole; over these place a thin layer of strawy matter to prevent the soil falling amongst the drainage below. Broken bricks, stone, or any similar material, may take the place of shells, the object being to secure good drainage below the border, and an inverted sod is the best covering for the drainage where a sufficient quantity can be procured. This being arranged, mark off another space of three feet width, and turn the soil of this trench over on the prepared bottom; this opening is prepared with drainage as before, and another trench marked off, and so proceed until the whole has been similarly treated. The additional soil required to bring the border up to a depth of two and a half feet of border, may be made up of good top soil, such as is often found in the line of an old fence, or headland, enriched with one-fourth part of a good rotted stable manure and one-fourth crushed bones and charcoal rubbish. These ingredients are to be well mixed previous to removal on the border.

Before spreading this preparation, the original soil on the border should receive a coating of manure which is to be dug in, then add the prepared soil; bringing the border, when finished, about two feet higher than the original surface. This forms the floor of the house, and must be calculated upon, in setting the posts for the building.

With regard to the extent of border, we prefer to make it all inside the house and six feet beyond, on each side at first, adding to it in after years, if such addition may be considered necessary. We do not believe that very extensive borders are requisite. We have seen some lately that are made inside the house only, and we consider it a most desirable arrangement, as the soil is completely under control, and can be watered or kept dry, as occasion demands. When the roots have access to outside borders there is much chance of danger to the fruit when ripening. A heavy rain after the fruit is colored will frequently retard its ripening, make the fruit watery and less sweet, and induce decay; the wood-maturing process is also arrested, and a late growth encouraged, which never thoroughly ripens, to the great injury of the succeeding crop.

Outside borders should, therefore, be covered in September by a good layer of manure; shutters or glazed sashes would be a better protection, but some means of throwing off heavy rains should be adopted.

Planting.—The vines may be planted any time from October to June. Usually, the border is prepared in the fall and winter months; then the best time would be about the middle of March. The plants will not have commenced growth at that time, and will be in good condition for setting out. Good growths may be had from plants set out as late as June, but they will then have made growth and require more careful handling. To ensure an early, vigorous start, mix a portion of leaf mould and sand in the soil when planting. The plants are generally raised in pots, and before placing them in the border, carefully shake out all the soil from their roots, without damaging the fibres ; spread them out and cover with about three inches of soil. If the plants have made some growth before removal, the roots must not be disturbed to any great extent, but the soil should be well pressed around all sides of the ball of roots so that when water is applied it will not escape through the fresh soil without moistening the roots, which is a likely occurrence if the plants have been undisturbed in the pots for a couple of years.

As to the age of the plants, whether those of one or two year's growth are best, will depend upon the treatment they have been subjected to. Healthy plants of one year's growth are in general to be preferred. There can be no objection to older plants if they have been allowed plenty of rooting space in large pots, but old plants with cramped, stinted and decaying roots, are to be avoided. In all cases, the plants are to be cut down to within three or four inches of the ground. Occasionally, a few fruiting plants, that have been prepared for that purpose in large pots, are planted so as to secure a few bunches of fruit the first season. These should not be considered as permanent, unless they are pruned down after fruiting, so as to form a new shoot from the ground. If the plants have commenced to grow before the ground is ready for their reception, they should not be planted until the end of April in the cold grapery, otherwise the weather might be too cold for their continued growth, and a check at planting would seriously affect their future vigor.

Management of the House.—For the first few weeks after the plants have pushed into growth, the house should be kept rather close. At no time during the period of active growth should the lower ventilators be opened. Even the doors should be kept carefully closed, to avoid currents of air, which is one of the most certain causes of mildew, and robs the air of its contained moisture, which it is of the utmost importance to preserve. The plants, and interior of the house should be sprinkled with water through a syringe every bright morning. The thermometer may indicate a temperature of 90° in the middle of the day, provided the air is kept moist, and it will be sufficiently high at 45° or 50° in the morning. A lowering of temperature during darkness is necessary to the well-being of all plants. During the month of May the night temperature will average higher than these figures; and when all danger from night frosts has passed, the ventilators may be left open a few inches, shutting close in very cold and stormy weather, and always endeavoring to get an advance of 20° to 30° of temperature during the day.

After the growths are sufficiently forward, select the best shoot and tie it carefully to the trellis, and rub all others off. It is perhaps better to merely pinch the points out of the second best, in order that a substitute may be had, should any accident befall the main shoot, which is not probable if carefully secured. Always tie loosely, so that the branches may have space to swell out. When lateral, or side shoots make their appearance, pinch out the extreme points of them immediately beyond the first leaf, as soon as it is practicable to do so, the earlier the better. Do not allow these laterals to produce five or six leaves and then pinch off to one, this is a waste of growth. The point is to be taken out of the leading shoot in a similar manner when it has made a growth of eight feet. All removal of leaves while plants are in active growth has a tendency to reduce vigor; and to get strength in the roots, the growth during the first year is frequently allowed to proceed undisturbed. It is a safe practice, to attend to the points, and remove them as soon as a leaf is visible, or stop the points of shoots. By merely removing a portion not larger than a pin head, growth is not checked, it is only directed into other courses, and the leaves that are left will grow larger, and benefit the plant more than a number of small laterals leaves would have done; at the same time, the eye at the base of the lateral is much strengthened, and as this eye produces the future fruit-bearing shoot, it is important that it receive all encouragement to full developments.

The routine management during the first summer will, therefore, mainly consist in the observance of these details. Keep a moist atmosphere by frequently sprinkling the house, and syringe every fine morning. Admit no bottom ventilation, and when the border becomes dry inside the house, which it may, about the middle of summer, give it a thorough soaking with rain-water, and previous to doing so, sprinkle a dressing of guano over the surface, which will assist growth.

By the middle of September, watering may be discontinued. It is necessary that the border should become dry, as well as a dryer atmosphere, in order that the wood-ripening process may be facilitated, for upon the thorough maturity of the wood all future success depends.

Prune in November. All the canes that average three-fourths of an inch in diameter are to be pruned back to lengths of eight feet; if stronger, they may be left ten feet, and all that are much weaker should be again cut close down to one or two buds, to ensure a new and more vigorous cane. About the middle of December the vines are bent to a horizontal position, and protected by straw or mats. A covering of manure is now spread over the border, both inside and out, to keep frost from the roots. No further care is required during winter; the house must be kept dry and airy, shutting up closely only in storms or frost.

Second Year.—One of the difficulties attending a cold grapery is, the liability to premature excitements in spring, causing the buds to swell and leaves to expand before all danger from frost is passed. On this account many persons prefer to have a furnace attached, so that a slight artificial heat may be given in cases of emergency.

Occasionally also in the fall, a slight fire is useful, especially if it is desired to keep the grapes hanging late; they may be kept up to Christmas, with a fire in frosty or damp weather. A furnace and flue is, therefore, a useful attachment. But where there are no means of applying heat, (and there are hundreds of graperies without it,) it is important to prevent early growth. The atmosphere must be kept cool, and we have found shading the glass a good method of retarding. The vines should also retain their horizontal position until the buds start at the lowest portion of the stem. They are then tied up to the wires, allowing the tops to remain pendant in order to encourage more vigorous growth in the lower buds.

Syringe the vines regularly every fine morning, and when growth has fairly commenced, give the inside soil a good watering. It should be a constant aim to preserve a moist air; in very warm days frequent sprinklings will be advantageous. Rigidly exclude currents of dry air from passing through the house; rather shade the glass slightly than be under the necessity of throwing all the ventilation open, currents of cold air being one of the most notable precursors of mildew.

The flower buds will expand about the middle of May; syringing must then be discontinued for a time, for, although a light misty wetting will do no harm even when the vines are in flower, yet it must be carefully done; dashing water forcibly on the flowers will do more harm than good.

The temperature may now range from 95° to 100° in bright sunlight, to 60° or 55° at night. It is not proposed to aim at keeping it at these figures, but this range will be safe. It is a good rule to have the house rather dry at night; that is, no heavy waterings or sprinkling should be given towards evening, until the middle of June, when danger from cold nights is not so likely to occur. It is a sign that the night temperature has been of the most agreeable character when the leaves are ornamented with drops of water round their edges. When the berries are formed, syringing should again be resumed, and about the middle of June allow an inch or two of the ventilation to remain open during the night, except in extra severe weather. This night ventilation we have found to have a decided salutary effect on the plants, enabling them to withstand sudden changes without injury, and to that extent hardening them against being mildewed, but only the top ventilators should be opened; we admit no bottom ventilation until the fruit is colored.

As soon as the bunches are well formed, they will require thinning, one bunch is sufficient to a shoot, and the whole crop must be reduced with reference to the size of the plant. A cane three-quarters of an inch in diameter may be allowed six or eight bunches of about a pound each. The weight of fruit, rather than the number of bunches must be the guide. When the berries attain the size of peas they will require thinning. The shoulders, or side divisions of the bunches are first brought up to a horizontal position and tied to the trellis; this spreads the bunch, and allows more berries to be retained without crowding. The most expeditious mode of tying up the shoulders is to procure a quantity of very fine wire, cut it into desirable length, form a hook at one end to catch the bunch, and fix in position by bending the opposite end round the trellis. Proceed to thin the berries with a pair of sharp pointed scissors, and it will be found much easier to thin before the bunches become hard and compact. The number of berries to be cut out will depend upon the kind of fruit, as some set more numerously than others; small fruited varieties do not require so severe thinning as the larger berried sorts. Those who have not the requisite experience will find it necessary to go over them several times during the summer, when they will acquire a knowledge of the operation, that will enable them to thin sufficiently at once in future.

It is important not to handle the fruit in thinning, hold the bunch steadily by the footstalk in one hand, and carefully insert the scissors so as not to injure the berries that are to be left.

Crops are frequently injured by injudicious summer pruning. Without a sufficiency of healthy active foliage, the fruit will not ripen to perfection. The reason for pinching out the point from a fruit-bearing shoot one or two leaves beyond the bunch, is to concentrate the growth so as to increase the size of the fruit and develope more fully the buds that are to produce future crops. When properly performed, these advantages may be secured without injury to the present crops. This is done by taking the extreme joint out of the shoot as soon as it can be observed, and before the leaves attain any size beyond the fruit. It is hurtful to the plant and diminishes its vigor, to allow the shoots to extend, and the laterals to grow for several weeks, and then cut off a foot or more from their lengths at one operation.

The general management of the house during summer has already been treated, and need not again be repeated in detail. The essential points are, to preserve a moist atmosphere during the early stage of growth, avoid currents of dry air, and if any signs of mildew make their appearance sprinkle flour of sulphur on the floor, especially in positions where the sun will warm it, as it is from the fumes generated when heated, that its active influence is obtained.

The fruit will be superior in flavor, if the soil is kept rather dry from the time it begins to color. The berries will perhaps not grow so large, but both fruit and wood will mature earlier and more thoroughly, by withholding water from the soil at this period.

When the vines are pruned in November, the soil should be covered with manure, both as a protection to the roots during winter and to enrich the border; cover with straw and lay them down on the surface, to protect them from the frosts and suns of winter.

Thus far is a brief detail of general routine management. The crop will increase annually for two or three years. The extent of training surface in the house limits the crop. The various modes of pruning will be more fully detailed in the sequel.

Forcing Grapes.—These remarks have reference more particularly to the cold grapery, or a house where sun heat only is admitted. To procure ripe fruit at an earlier period, resort must be had to artificial heat, usually termed forcing.

The first consideration in arranging a forcing house is a border for the roots. It is very evident that only partial success will follow, if the roots are placed in a lower temperature, relatively, than that in which the branches are placed. It is not necessary to discuss this matter to a great extent, we will therefore, at once observe, that we have come to the conclusion, (after a lengthened experience,) that the soil should all be within the glass roof, no border outside. Extensive borders are not an absolute necessity, either for cold graperies, or those that are forced. Let the border, therefore, be made wholly inside the house, well drained and arranged as before recommended. With regard to the modes of heating, there is no question but a hot water apparatus is best. It does not follow, however, that a hot air flue and common furnace will not answer a good purpose, and for a small single roofed house, not over thirty-five feet in length, and twelve in breadth, a flue is least expensive, costing about one-sixth of hot water fixtures to heat such a sized house. When the the house is sixty feet and upwards in length, hot water will then be the most economical in the end, as two furnaces would be required in it to force grapes, even to ripen by the end of June. Water being a good conductor, carries heat a long distance. Air is a bad conductor, and while the flue is heated to a high degree near the furnace, it will be comparatively cool forty feet from it. In the one case there is an extensive surface radiating heat at a low temperature; in the other, the greatest heat is confined to a limited surface, and is therefore radiated at a much higher temperature.

Very slight forcing will be required the first year. Plant about the 1st of March and keep the temperature about 55° to 60° during night, allowing an increase of 20° to 25° during the day. The treatment of the plants during growth will be similar to what has already been detailed. To hasten the ripening of the wood, the soil should gradually be brought to a state of comparative dryness by the end of August, and this is one of the great advantages of having the border under control. It may appear that having the borders thus isolated from rains, much labor would be required in watering; such is not the case. A thorough watering once in six weeks, even during the most active period of vegetation will be sufficient. The soil should be occasionally hoed up loosely for the first two or three months, and by the end of June a thin loose mulch of manure or leaf mold will help to retain moisture, arresting evaporation.

The grape is the easiest of all fruits to force, although, as a matter of course, close attention is required in keeping a suitable temperature in severe seasons. To have ripe fruit by the middle of May, forcing should be commenced by the middle of December. At least five months should be allowed from the first application of heat until the ripening of the fruit. The principal points of attention will consist in supplying a proper degree of moisture in the atmosphere. The constant tendency of artificial heat is to abstract moisture, and a regular condensation is also produced by the cold glass surface, and the greater the difference between the external and internal temperatures, the more rapidly is atmospheric moisture consumed.

A most important but much neglected practice, auxiliary to retaining heat in glass structures during the winter months, is that of outside covers. Considering the palpable economy of such covers, it does seem strange that they are not more generally used. We have ascertained from repeated experiments, that a simple, close-fitting cover of muslin, elevated a few inches above the roof so as to enclose a stratum of air, will effect a saving of 15° of heat. During high winds the saving is somewhat reduced, but a heavier and closer covering would show a proportionate increase of temperature. It is perhaps unnecessary to enter into a minute description of this arrangement, as any mechanic could readily apply it, but it is most essential that the covering should not touch the glass, as it would then afford very little protection.

Air must be admitted with caution when the external temperature is below freezing; rather allow the thermometer to indicate 95 or 100° of heat than admit a cutting frosty wind; with increased heat there must be increased moisture. Great regularity in syringing the leaves will prevent the increase of insects, and an occasional slight fumigation with tobacco will further tend to cleanliness in this respect.

Growing Grapes in Pots.—At present the pot culture of grapes is much agitated, and in some quarters much advocated. As to its general utility, we do not expect much, but for a very early crop the system is good. We will briefly detail our mode of pot culture for the benefit of those who may be inclined to adopt it. We have cut ripe grapes from plants in fourteen months from the planting of the eye, but prefer to grow the plants two years before fruiting. The first year the plants are grown in seven inch pots, but must be grown under glass; a close fitting frame, deep enough to contain the plants, will be suitable during the first season, when watering and staking is all the attention required. When the foliage falls, they are pruned down to two or three buds, and kept in a shed or cellar, secured from frosts.

About the first of March they may be brought into a greenhouse, or placed in a warm frame to excite them into growth. When they have made an inch or so of young wood, re-pot into twelve-inch pots, shake some of the soil carefully from the roots, and spread them out on the soil when re-potting. A soil formed of rotted sods, mixed with one-fourth of leaf mold, or rotted dung, will be suitable, broken bones or small pieces of charcoal with the soil will tend to preserve its porosity. The pots should have two inches of drainage, covered with a sprinkling of moss to render it more effective. The treatment during summer should be similar to that recommended for the cold grapery so far as pertains to the atmosphere. When growing freely, they will require close attention to watering; neglect in this respect will injuriously affect the growth. Whether they will be fruitful or not depends altogether upon their management this season. One stem only should be retained, and when this has grown about a foot or so, stop them at the sixth leaf, leaving all the laterals, except the topmost, which should be removed as soon as it can be distinguished; this will cause the topmost bud to grow, and the check occasioned by its removal will tend to develope more fully the lower buds, and cause them to be fruitful. After the topmost bud has again pushed and formed two or three leaves, all the laterals are shortened to two leaves. Stop the leading shoot a second time about nine buds or eyes from the point where it was previously stopped. Afterwards, keep all the laterals shortened, but do not remove them entirely until growth is completed. We have seen canes thus prepared that have shown twenty-five and thirty bunches of fruit in lengths of seven feet, all of which are removed except six or eight. This is all that the plant can properly ripen. As the canes ripen, gradually reduce the waterings, and about the middle of September have the whole matured. Then prune out all laterals and cut the cane down to the point where the second summer topping was performed. Three or four weeks previous to forcing the plants, lay the pots on their sides in some out of the way place, lay the canes flat on the ground and cover them over with three inches of soil, keeping the soil moist, but not saturated, with water; this peculiar treatment we have not seen recommended, but having practiced it, we have found that the wood will imbibe moisture, the buds swell, and force into leaf after being placed in heat, two or three weeks sooner than when the canes are not thus rested; it gives them some of the advantages that they receive from a winter's rest.

The plants being thus prepared, their future management will be similar to that detailed for the forcing house. After the fruit is set, they may receive a weekly watering of liquid manure, which will increase the size of the berries, but all manurial applications should be stopped, when the fruit changes color. In practising the method here detailed we have had the greatest success with grapes in pots.

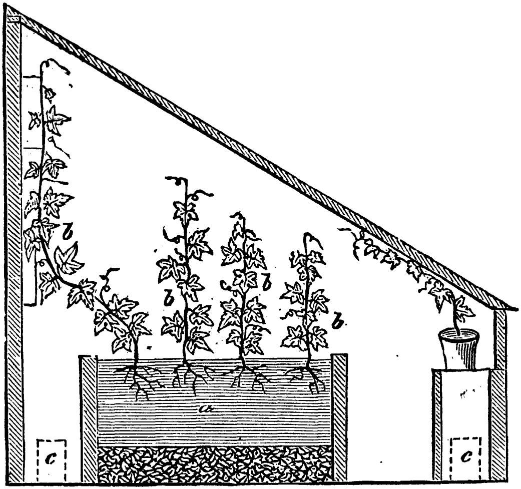
Small inside borders for early forcing.—The principal object attained in pot culture of fruit trees, is the entire control over the roots, and it is a very great advantage in the early forcing of plants to have the roots surrounded by the same atmospherical temperature in which the branches are placed; no plant can be kept in a healthy condition for any length of time when the branches are stimulated in a high temperature and the roots kept in a cold medium.

The principal objections to pot culture are the amount of labor involved in watering, potting, &c., and the inevitable failure that will result from even slight neglect of these operations; and in a climate so varied and intense as ours, the labor and constant watchfulness required, presents a serious barrier to the extension of this mode of culture.

So far as complete isolation from external influences is of importance, all the conditions can be secured by forming a small border inside the house, and planting out the vines with a view to permanance.

This arrangement may be likened to the planting of a number of vines in one large pot, instead of one plant in a smaller space; for a border in this condition is as much under the control of the cultivator as a pot, with the advantage of being less influenced by extremes. We have had such borders divided into spaces, so that the roots of each plant was confined, but we found no advantage from this mode. Strong growing vines can be kept under control by judicious summer pruning, which abridges their root growth, without injuriously affecting the growth of weaker varieties.

The following figure will show this arrangement. The soil in the space *a*, has no communication with the walls of the house, thus securing complete isolation from the external atmosphere. The soil is placed upon a stratum of drainage, and in order to more effectually surround the roots with the atmosphere of the house, large sized draining tiles, or open work brick flues should be placed across the bottom of the border, through the



FORCING HOUSE.

drainage; these air-drains should be frequent and left open at the ends, so that the air may permeate the soil. This will keep the soil at a proper temperature, provided care be exercised in watering. These drains are not an absolute necessity, as soil is warm or cold just in proportion to its contained moisture; so that a border continually soaked with water, although drained in this manner, will be colder than a more carefully watered border without such additions. The heating medium will be placed at *c* in the section. The plants *b* are set closely together; they are placed two feet apart, in rows three feet distant. This close planting secures a heavy crop at once, and allows the cutting down of a cane occasionally, or each alternate cane yearly, as may be desired.

In an economical point of view, the quantity of fruit that may be grown by this arrangement is much greater than can be secured by exclusive pot culture, and for early forcing, all its advantages are secured.

Diseases.—When a systematic course of culture, such as we have attempted to describe, is fully carried out, there will be no losses from disease. It might be observed that what is termed rot, will only occur when the roots are in a wet soil, or one that is too rich. Mildew will also be seldom seen, if at all, in the above system of culture. It is destroyed by sulphur, and, as we have already observed, washing the interior woodwork with a solution of lime and sulphur is an excellent preventive both against mildew, and the attacks of such insects as thrip and red spider. The causes that produce mildew have not been thoroughly defined. Extreme, or sudden changes of atmosphere, are the commonly received reasons. We have long considered that it originates from dry air acting upon tender vegetable tissue; our cultural practice is based upon this supposition, and, not to discuss the subject further, it may be stated that when fully carried out, we never have any mildew in graperies.

Pruning.—When a seed is placed in a germinating medium, it sends a shoot upwards in the air, and roots downwards in the earth. The seed contains within itself the nutriment necessary for this process; but as soon as the young plant is thus formed, its mode of existence is changed, and it then depends upon the air and soil for its further developement. The young roots absorb matter from the earth which enters into the stem, and from that to the leaves where it is decomposed by the action of light. This elaborated sap is then returned downwards, enlarging the stem, and passing into the roots, extending their formation. Such, we are told, is the theory of vegetable growth. It is considered that the carbonic acid and other matter that is absorbed by the roots, is of no value until it undergoes this decomposition in the leaves; consequently, the increase in size of the plant, the quantity of its secretions, and extension of roots, are all dependent upon the amount of foliage. Any system of pruning, therefore, that involves a removal of leaves, must also injure the health and vigor of the plant. It is an axiom with horticulturists that summer pruning weakens, while winter pruning strengthens a tree. Hence, on strong growing barren fruit trees, summer pruning is practiced in order to check their vigor and cause them to bear; while on the other hand an old or sickly tree will generally start with renewed vigor if severely pruned in winter. These rules should be kept in view while discussing systems of pruning.

The *short spurring* system of pruning grape vines is very simple and easily understood. A single shoot is encouraged until it reaches the desired length. The bearing shoots issue at intervals from this main shoot, and are cut down to one or two eyes in the winter pruning. The summer pruning consists in pinching out the extremity of every shoot one or two leaves beyond the fruit; all lateral growths are also pinched back. Growth is thus prevented from extending, and the vigor of the plant is consequently concentrated into the short fruit-bearing shoot. The leading shoot is also stopped of its longitudinal growth to throw more strength into the side branches. This is a popular method of treating grapes under glass, but not adapted to native varieties.

Alternate spurring is considered an improvement upon the above. In spur pruning, the shoots are cut down to one or two buds, thus sacrificing better developed buds nearer the extremity of the branch. Alternate spurring proposes to remedy this. Supposing the branch has ten buds or eyes, and the sixth from the main stem appears most fully developed, the branch is cut down to it. It and the first bud, (the one nearest the main stem,) are undisturbed, and the intermediate four buds are cut out. When growth commences, these two buds will form two shoots whose future treatment is quite distinct. The extreme bud produces the present crop, while the lower bud forms a shoot to bear next year's produce, and the fruit that appears on it is removed. The summer treatment of these shoots is simple. The bearing branch should have its extreme point pinched out two or three leaves beyond the bunch of fruit, and all subsequent growths quickly checked. The lower branch, which is not allowed to fruit, should extend undisturbed until midsummer, when the extreme point should be pinched off. As soon as the fruit is gathered, the branch that produced it is to be cut clean out, which will throw much vigor in the maturing of the branch that is to bear the future crop; this branch will in the winter pruning, undergo the same treatment as its predecessor—that is, pruned down to the best bud, all others being removed except the lowermost, as before.

The long cane renewal system has its chief recommendation in the yearly production of a long cane of young wood. The finest and earliest fruit, it will have been observed, is always produced on such shoots. Any system of culture, therefore, that produces these, we would pronounce to be good; we therefore think much of the renewal mode. It is simply a more effectual carrying out of the alternate spurring method; and is what we have explained more fully in our previous remarks on native grapes.

Pruning on this method combines all the advantages of close spurring, while the greater amount of healthy foliage retained, supports a healthy and increasing root action. We prefer it to all other modes of pruning.

Keeping Grapes on the Vines.—As remarked when treating on the cold grapery, the fruit may be kept several weeks or even months after ripening. Some kinds keep better than others. The difference seems to depend upon the proportion of sugar they respectively form; the sweetest grapes keep best, the most acid, worst. The Muscats will keep longer than the Black Hamburgh. Others are late in ripening and hang well after maturity, such as Prince Albert, Black Ferrar and Lady Down's seedling.

The practical points of attention in keeping grapes on the vines are first, to keep the house and atmosphere dry; and secondly, to keep the roots and soil dry. During damp weather it will be necessary to open the ventilators and put on a slight fire which will expel the damp. A slight shading on the glass is also favorable. Much depends on keeping the soil dry, and with regard to this, the practice of making all the border under glass, where it can be kept dry when required is most useful. Covering outside borders with shutters so as to throw off rains will be essential and absolutely necessary to preserve ripe fruit. Attention to these points will enable the cultivator to keep grapes for months.

Kinds to Plant.—For a cold grapery requiring forty plants we would recommend the following proportions. Twelve Black Hamburgh, two White Frontignac, two Black Frontignac, two Golden Hamburgh, two Muscat of Alexandria, six Victoria, two Chasselas Fontainebleau, one White Gascoigne, two Black Prince, two West's St. Peter's, two Muscat Hamburgh, two Malvasia, one Black Ferrar, and two Lady Down's Seedling.

For the forcing house we would substitute, two Chasselas Musque, two Bowood Muscat, and two Muscat of Alexandria, for White Gascoigne, West's St. Peter's, Black Ferrar and Lady Down's in the previous list.

For pot culture, Black Hamburgh, White Frontignac, Black Prince, Chasselas Fontainebleau, Chasselas Musque, and Wilmot's Black Hamburgh will give most satisfaction.

In the foregoing brief essay on grape culture, we have purposely refrained from entering into a lengthened discussion of the theory of the subject, or canvassing disputed points, believing that a detail of successful practice would be more in accordance with the requirements of the "Farmer and Gardener."

PHYSIOGRAPHY,

IN ITS APPLICATION TO

GRAPE CULTURE.

BY F. J. COPE.

IT may be deemed presumptuous, at the present day, to assert, that our whole system of fruit culture is based upon incorrect principles, and is, therefore, erroneous.

We should reason from what we know. Any hypothesis deduced from false premises, cannot long withstand the test of rational scrutiny.

In discussing the subject of vine culture, let us, then, begin at the beginning.

When, on the "third day" of the Creation, the Great Architect of the universe formed the "grass, the herb-yielding seed, and the fruit-tree yielding fruit after his kind," He saw that it "was good." And on the "sixth day," when all his labors were finished, He pronounced "every thing that He had made *very good.*" From the vast vault of heaven, spangled with the twinkling gems of night,—far, far away into illimitable space, where unseen asteroids obey the laws of gravitation and attraction, down through the air to the rugged earth, one harmonious whole performs the legitimate functions in its several parts. From the lowliest Fucoid that grows in the sea, up to the stateliest Cedars of Lebanon, or the Sequoia Gigantea upon our own continent;—from the most minute, infinitesimal Infusoria, up to the most majestic Pachyderm, the hand of nature implanted no germs of disease, although she provided ample stores of remedial agents, to be used at another epoch, by succeeding generations of her creatures.

There is a closer affinity between the animal and vegetable organisms than most of us are willing to admit. Discarding the untenable, though in many respects plausible, "development theory" of Maillet and Lamarck, we must not run into the other extreme, and deny that there is any similarity in any portion of animal and vegetable physiology. We know that plants, as well as animals *eat;* that they breathe, perspire, and are sensitive to the touch. We know that they have sexes, and a circulatory aparatus; that they sleep, although, unlike the sluggard, the first rays of the morning light awakens them, to join, it may be, although their voices are inaudible to the human ear, the songs of thanksgiving and praise that resound from the feathered vocalists. They send their messages of love through the ambient air that they perfume with many odors, employing the busy bee, which becomes the Cupid in the dominions of Flora and Pomona, inviting willing mates to connubial felicity, and thus they, too, "multiply, replenish, and adorn the earth."

It is man alone that mars this glorious scene, by his futile attempts to improve what the hand of Deity had already made perfect.

I submit and defend these simple propositions:

First. We stimulate too freely.

Second. We prune too much, and

Third. The more we depart from the dictates of nature, the more rapid will be the ravages of disease, and the ultimate destruction of the cultivated fruits.

Von Martius, a learned German author, published several years ago, a history of the diseases of the potato. From this work, I extract the following passages as applicable to my first proposition:

"However great the extent," says he, "to which cultivation and civilization has improved the little Peruvian exile, (the potato,) yet, like all other things redeemed from barbarism, and *removed from the wild vigor of nature*, a weakness of constitution has been fastened upon it, and the stimulus of too much culture is diminishing its powers It has been discovered in this, as it has been in all departments of breeding, *whether in the vegetable or animal kingdom*, where the cultivation is artificial or overdone, that there is a determined disposition to return to its original and natural condition."

Some pomologists, and many other people, too, assert that the little sour crab is the type of the whole genus *Malus*, from whence is derived all the luscious varieties that we now have, and that these varieties have been produced by cultivation.

If the "forbidden fruit," in the garden of Eden, was really an apple, according to our definition of the term, then it must, according to the pomologists and others aforesaid, have been a crab. We may, or may not, consider it "pleasant to the eyes," but surely none of us admit it to be "good for food."

Cultivation never has, and in all probability never will, effect any considerable change in the austereness of the wild crab apple. Recent experiments with it have only resulted in diseasing the tree, and rendering it short-lived. And what has cultivation done for some of our oldest and most favorite varieties? It is well known that the Rambo, a native of Pennsylvania, is extensively diseased; that with all the care we bestow upon it, the tree is becoming more tender every year, and the fruit scabby, ill-shaped, and wormy. So with the green and yellow Pippin, the Vandevere, and many other sorts. The pear has fared very little better; the cherry and the plum decidedly worse. We have rendered the tissues of the latter so extremely tender and delicate, that the superabundant juices have burst their avenues of circulation, and formed unsightly "black knots" upon the branches, in which the curculio now propagates its species.

The assertion that this disease of the plum is *caused* by the curculio, is proven to be erroneous: on the contrary, it is susceptible of demonstration, that the insect deposits its larva in the excrescence after the latter has been formed, and there finds congenial nourishment in the absence of fruit, which is its natural food.

Nor have the Cereals escaped the baleful effects of this undesigned raid upon their productive capacities. The Midge, the Hessian-fly, the Army-worm, the Grub, and the Cut-worm, have been invited to feast upon the banquet that is annually spread by the cupidity of the "lord of creation," himself a living example of the effeminacy produced by a false system of dietetic indulgence. One would naturally suppose that rational man would have been admonished by the direful effects of his cuisine refinements, to abstain from applying to vegetable and animal life, which constitute his food, the stimulating processes that have been the bane of his own. The cutaneous eruptions, dyspepsia, the caries in his teeth, the baldness of his head, the loss of vitality in his hair; in short, the enervation of all his physical powers, might warn him to beware how he should use the dominion that has been entrusted to his keeping: but he looks not beyond the gratification of to-day, and makes little provision for the generation that is to succeed him. Literally, in this, "he takes no heed for the morrow."

One of the lecturers at "Old Yale," recommends importation of some families of the Ichneumonidæ, to extirpate the wheat Midge, without reflecting that we may "get more than we bargain for." Are we sure that the Ichneumon fly would die out to accommodate us, just after it had performed the duty we had required of it? It may alter its diet. Who knows what it would then be?

Two years ago I sought for the cocoon of the "Peacock Butterfly," (Papilio pavonia,) for the purpose of filling a void in my entomological collection. I found many of them; but in every instance, the substance of the chrysalides had been abstracted by some predacious insect. The strong, rough fibres of the cocoon had been misplaced and fixed by a glutinous substance, so that an aperture about one-sixteenth of an inch in diameter was formed, to admit the ingress of the insect, and the egress of the new-born Ichneumonidan, which had thus been provided with a snug habitation, and an abundance of good fare. This winter I find the cocoons all perfectly sound. Has the insect found more congenial food? Was it driven to this system of foraging by some dire necessity? May not the same causes produce the same effects in other department of insect life?

Another lecturer at Yale College has asserted that it is only since the destruction of our forests, in which the natural food of insects now injurious to cultivated trees was formerly obtained, that they have been induced to attack the latter. Is not this an argument against the propriety and expediency of importing the Ichneumon fly?

Great men, as well as common folks, sometimes make great mistakes. Huber asserted, that the neuter or Worker-bee, was nothing more nor less than an "*imperfect female!*" That is mere conjecture, and will not answer in this matter of fact age. God never made whole races of His creatures mere abortions. He permits monstrosities occasionally, but never made so gross a mistake in the organism of an entire class.

But it may be objected, that this is foreign to the subject in hand. The general principles are undoubtedly applicable. No system of culture, whether of animals or vegetables, can be permanently successful, which overlooks or discards them.

We may speak with great confidence of the success attending particular methods of applying various combinations of fertilizing substances. We may describe minutely, the time and the mode of pruning and training the vine, which produced such present magnificent results; and after all, it may be only the "killing of the goose that laid the golden eggs." We should write, and work, and think, not alone for the benefit of the present, but for succeeding generations as well. We should be contented with a moderate return from the bounteous bosom of the earth, for the little that we can bestow upon it, or that nature requires form us. Nature and art will harmonize only so long as no violence is done to established laws. Production will have its compensation. It demands no more; it will take no less.

Persia has generally been supposed to be the native country of the vine. This supposition, however, arose from the fact, that the earlier historians were totally unacquainted with the luxuriance of its growth over the entire American continent. In the several States of this Union, from those on the south possessing a temperature almost as hot as the tropics, away up to the farthermost limits of Maine, on our northern border, the forests almost every where afford evidences of its primeval growth. The adaptation of our soil and climate, diversified as they are, to its healthful development, is manifested in the gigantic proportions which it frequently attains. On the hills north and south of the beautiful little valley in which I live, they cover the tops of the tallest trees, more than seventy feet high. Many of them are four and five inches in diameter. One of them is over seven.

On an adjoining farm, by the side of a little brook that rolls its crystal waters through a beautiful natural meadow covered with a virgin sod that the plow had never disturbed, there stood, thirty years ago, a majestic elm. Out of the soil between two of its mammoth roots, grew a vine, (the *Vitis æstivalis,*) that was then thirty-one inches in circumference! I have sat beneath its ample shade, to eat the evening meal, while the odors of new-mown hay, mingled with the perfume of the *Vitis cordifolia* in an adjoining grove, imparted a relish to the frugal repast, which no culinary art could bestow. Such a vine was a fit companion to embrace such a tree. There they had both grown for ages, not a branch nor a twig of either diseased; drawing abundant supplies of nourishment from the earth and the air, and cast-a deep shadow in the noontide sun, forty feet in diameter! Nature had abundantly furnished them with food prepared from the debris of extinct organisms; for Byron has truthfully said,

> "The dust we tread upon, was once alive."

Wild strawberries, (*Fragaria Virginiana,* and *F. Canadensis,*) the raspberry, blackberry, wild plum, wild cherry, black walnut, butter-nut, (*Juglans cathartica vel Cinerea,*) hickory-nut, (*Juglans squamosa,* of Michaux,) and the hazel-nut, all grow luxuriantly, and produce abundant crops of fruit, in the same little vale. Are such facts as these, and the lessons they are so well calculated to teach, to remain for ever unheeded in our civilization?

There are living examples all around me, of how little nature requires at the hands of man, to make the vine prolific, and keep it in robust health for unknown ages. Drawing my lessons principally from the volume she opens out before me, I draw scantily from the pages of Bede, of Lombarde, of Loudon, of Morier, of Hoare, of Marsh, of Walter, of Bartram, or of any of the thousand others whose dogmas are the vade mecum of our culturists. Valuable as any of the suggestions undoubtedly are, which some of them make, I "pin my faith" exclusively upon neither of them, believing, as I do, with our native poet, Street, that

> "Nature is man's teacher. She unfolds
> Her treasures to his search, unseals his eye,
> Illumes his mind, and purifies his heart;
> An influence breathes from all the sights and sounds
> Of her existence."

Nature never propagates by scions or cuttings; she does, sometimes, by layers; more frequently by sprouts; but generally by seeds. The latter may be said to be the rule—the others merely exceptions. I am convinced by experience and observation, that no vine can very long maintain its original vigor, which has been for a series of years annually pruned in nursery style, and the denuded branches thus obtained, forced into the germs of a separate organization.

Oxygen is the great leveling agent of nature. It reduces with equal facility, the hardest steel and the softest tissues, into their original elements. It is present every where to begin its labors of decomposition, where moisture comes to its aid, and the principle of life has been attacked. Its ravages may be arrested; but the work it has done, it has performed effectually, and is past reparation. Let us reason about it.

No human eye, unaided by the microscope, can detect the change that almost instantly occurs in the sap of the vine when in active circulation, after it has been separated from the parent stock. Without the intelligent use of this instrument, no one is qualified to assert, that healthy vines have been grown from scions several days old, to say nothing of those which may be weeks and months in a state of suspended functional activity. We may be deceived by apparent healthfulness in the vegetable economy, as we often are by the hectic flush upon the cheek of the unfortunate consumptive. The germs of disease are nevertheless there. The offspring may for awhile manifest no symptoms of the delicacy and disease which have been transmitted to it. But when surrounding circumstances favor their development, death claims alike for his own, the tender vine that clings for support to some stalwart tree, and the hapless child that yields up the transient present for a better and more enduring life. Oxygen labors for both, living or dying.

The theory, for many years generally accepted, that plants took up that portion of their nourishment which they derive from the earth, exclusively by means of little vessels termed *spongioles*, situated at the points of the small fibrous roots, has been but recently exploded, although its incorrectness was susceptible of very easy demonstration. It required only the authority of some great name to give it credence; and in like manner, the public judgment seems only to require the ipse dixit of some pseudo savant to nullify it. And now the arboriculturist wonders that he has been so long deceived! Is it not time that we should be enlightened upon some other points in vegetable physiology? Who, with a sufficient capacity to comprehend the phenomena of plant-life, will devote his attention, his time and his talents to such a pursuit? Are we to plod along, and stumble upon facts only as they come in our way? Or shall some one, availing himself of the fragments of thought and opinion already evolved, analyze the crude mass, and give us a reliable diagnosis? I hope the "*Farmer and Gardener*" will be one of the channels through which we will at length reach such a desideratum.

The vine, in Europe, has a history. Here, in the new world, the reliable data upon which it must be based, are not yet collected and arranged. The interchange of opinion in this, as it is in every other department of human knowledge, is desirable, if not essential, to a correct understanding of the causes which lead to progress, to culmination, or to decay.

Neither Cæsar, Pliny, nor Tacitus, notice the vine in their descriptions of Great Britain; but in the commencement of the eighth century, we know that some progress had been made in its cultivation; and in the latter part of the ninth, mention is made of it in the laws of Alfred. During the reign of the second Edward, excellent wine, we are told, was made in England. William of Malmsbury, speaking of the vale of Gloucester, says: "This district, too, exhibits a greater number of vineyards than any other county in England, yielding abundant crops, and of superior quality." Again, speaking of the Isle of Ely, he says, the soil "is covered with vines, which either trail on the ground, or are trained on high, and supported on poles." The vine grew so plentifully during the time of Richard II., in Windsor Little Park, that part of the wine made there was sold for the king's profit.

Why vineyards should have so completely disappeared in that country, as is well-known at this time, would be an interesting inquiry, and might shed much light upon the mode of cultivation, to which, in all probability, their abandonment may, in a great degree, be attributable. The soil and climate so favorable to them, then, are the same now.

In a state of nature, the vine, (*Vitis vulpina*, of

Bartram,) is more abundantly supplied with small roots, than when highly cultivated. The texture of the woody fibres more compact; the pores of the vascular tissue not so well defined, but more numerous, and the number of its medullary rays greater, but less marked. Cultivation has undoubtedly effected these changes, whether for the "better or worse," remains, perhaps, to be determined. What share pruning has had, in this metamorphosis is, I think, easily demonstrable.

By the use of a powerful microscope, the mouths of the pores may be seen all over the surface of the roots. Through these, the aliment prepared in the earth enters, and is taken up into the circulation, each pore conveying its proportion toward the point where its other extremity terminates. Now, when a branch of any considerable size is cut off, the sap destined for its support and nourishment, must do one of three things—either go back to the earth—be absorbed by other contiguous portions of the vine—or remain in the surcharged vessels, to undergo the chemical changes which precede decomposition. Which is it?

I have lying before me, a longitudinal section of a pruned (Isabella,) and another of an unpruned one. I have, also, transverse sections of the same vines, showing the enlarged pores on the side of the pruned specimen, below the point where the branch was cut off, and the incipient decay is clearly visible by the use of the microscope. I am sorry that I am not expert at drawing, to enable me to illustrate this fact. But such of your readers as are sceptical upon the subject, can readily satisfy themselves by instituting a similar examination.

Here, then, commences the struggle between nature and art. Will there always be recuperative energy enough in the former to triumph? I think not. She may withstand many assaults, but each time with diminished powers. Does it require any extraordinary prescience to see the final result?

In this latitude—in good old Pennsylvania—where the soil and the climate seem peculiarly adapted to the vine, the pruning is generally done after the fashion of European models, and by Germans, almost every one of whom claims to know how to dress "*ein vein-garten,*" whether he comes originally from the vine clad hills of the Rhine, or the cold, barren wastes of Westphalia; and whether the subject of his manipulations be transported from Hamburgh, or be "to the manor born," he cuts and slashes away, with as little thought about the difference between an exotic and an indigenous plant, as he is capable of giving about the requirements of either, even in his own "*vaterland.*" Save us from such empiricism as this, spirit of Esculapius!

The healthiest and most prolific vines I have ever seen, are those that have never been pruned at all. But it is unsafe to cite particular cases to sustain a general rule in vine culture. There are so may circumstances to be duly weighed and considered—those of exposure, consituents of soil, situation, &c., &c., that what is applicable in one instance, may not be so in another.

Now, friend Spangler, having given you "quantum sufficit" of "premonitory symptoms," here followeth my prescription. I give it with all becoming humility and deference to the opinions of the *great doctors:*

If you want healthy vines, such as your children, your grand-children, and great-grand-children, as well as yourself, may eat the fruit of, procure the seeds of good healthy grapes that you think suitable to your locality. Plant them in a pot filled with good garden soil. When two years old, set them out where you wish them to remain. Train them against the side of a house, facing the east or southeast—against any other building—a wall, along a trellis, or on a fence. Never cut off a large branch. If any small ones show signs of weakness, take them off in the fall. Pinch off any sprouts that may arise, either from the root or the main stem, after the fruit has set. Let the leaves alone —they will drop off time enough. Train up but one main stem. Divide and spread the branches annually in such a way as to give the whole the benefit of air and light, as much as possible. About every third year, remove the surface soil, and replace it with a compost of lime and leaf-mould, in proportions of one-eighth of the former. Well decayed saw-dust of deciduous trees, will do in place of the mould.

I am inclined to think, that the whole theory of fertilizing "lies in a nut-shell." Such substances as have the power of absorbing, and imparting moisture slowly, are the best. The vine requires a liberal supply of this element, but it should be imparted steadily and not excessively. Mulching is almost indispensable, at any stage of its growth. In the forests, this is supplied by the annual falling of leaves. You will always find, that a wild vine thrives the best, where the soil around it is thickly covered with leaves.

It may be objected, that this seedling business would be rather a slow process for this fast age; and that if the parent is unsound, the seed also will be more or less so. True, but in the first case, it will be found to be the surest; and in the second, the chances are in our favor. Think a little. Suppose every one in this country who wishes to enjoy this delicious fruit, would plant seeds of the Franklin, the Delaware, the Clinton, Isabella, Catawba, Concord, Diana, or any other so-called natives, would there not be, in a few years, plenty of them better than either of the originals? Taking the seeds of the best of these again, could we place a limit to the ultimate improvement of which they are susceptible? Friends of the vine every where, try it. Encourage your little girls to try it. Let them begin now. Don't be driven from your purpose by the clamor that may be raised against it. Your children, if you are fortunate enough to have any, will take delight in watching the development of the young plant, trained by their young hands. I know it. And oh! what a recompense it will be, to partake with them, of these offerings of little goddesses, no less sacred to you, than was Concordia to the ancient Romans, though the altars *you* rear to *your* household deities are only raised, unseen, but not unfelt, in your heart of hearts.

If you wish to have well-established varieties, either native or foreign, I would recommend planting the eyes or buds, with a small portion of wood attached. I think they grow more readily than whole scions; they are hardier, and can be more easily attended. Besides, they have less room for disease, and you increase the chances of securing a plant of a favorite variety. Treat them as directed for seedlings.

Lastly; if you are in a hurry, trust to the honesty of some well-known vender, and get rooted plants of such kinds as you want. Plant them and treat them as directed for seedlings—and may their shadow never grow less, nor the juice of the grapes they may yield, ever be perverted to inebriate another Lot.

A CONTRIBUTION

TO THE

CLASSIFICATION OF SPECIES AND VARIETIES

TO THE

GRAPE VINE:

WITH A FEW HINTS ON CULTURE.

BY J. M. M'MINN, CIVIL ENGINEER.

The following remarks have been prepared from notes and observations made during the last twenty-five years, which period of my life has been devoted to the active scenes and operations of rural life, and separated in a great measure from the advantages of scientific association, or recourse to libraries. Whilst this attempt at classification will embrace a large amount of practical observation, it will probably, not embody the settled deductions of scientific research, and will therefore, be susceptible of important changes and corrections. For this reason I have not attempted to establish the number of species of grapes now known, nor to settle either the identity of varieties, or their origin; my reasons for this, are, that I am fully sensible that in some instances at least, some such decisions would not be admitted. I shall present only what I conceive to be the correct conclusions, of practical cultivators, and admitted scientific authorities. If, therefore, my attempts at classification have not been entirely successful. I am led to hope that this, almost the first effort made in this direction in this country, may lead others to follow in the path pointed out, and that the result will be a full and complete classification of species and varieties.

The learned Agassis says:—"Species exist in nature in the same manner as any other natural group; they are based upon well determined relations to individuals, to one another, and to the world around them, and upon proportions, the ornamentation, and the relations of their parts."

Varieties are produced by hybridizing, that is, mixing the pollen of one species or variety, with the pollen of another. This is very readily done in the grape by the numerous insects which frequent the flowers of this plant. Burying their feet and other organs in the pollen of the flowers of one species, they carry it to another species, and thus impregnate the organs of the latter. A hybrid is the result, by reproduction of the seeds, and new varieties are thus multiplied in almost countless numbers. But varieties are never permanent. If they are the products of hybridization they return to their original in the third or fourth generation. Varieties are also produced temporarily by climate, soil and cultivation, but the specific identity is never permanently lost by propagation by seed; the hybrid therefore, can only be continued by grafting, layers, or by maintaining the wood and vessels of this artificial variety.

The Grape belongs to the natural order *Vitacœ* of Jessien, and to the class *Pentandria* and order *Monogynia* in the artificial system of Linnæus. The flowers in the species found in the old world are generally perfect, but in the American species, they are seldom perfect, and frequently, the male and female flowers are on different plants, hence the early confusion in our books assigning some of the American and Asiatic species to different genera.

The name Vitis was adopted by Tourneforte, and accepted by Linnæus, (see Genera Plantarium, 1764, page 112,) and is now the established name in botanical language for the grape vine throughout the world. Vitis is derived from the Celtic *Gwid,* "the best of trees;" from which comes *Gwin* the name of wine in the same language, οἶνος, in Greek, *Vinum* in Latin, *Vigna* Italian, *Vigne* French.

The vine has probably engaged as much of attention as any other object in the vegetable world. It has been co-eval with civilization at all times, and in all counties south of 50° of north latitude, and north of 30° from the equator. It succeeds best in countries where the mean summer temperature is between 67° and 69°. Fabulous history informs us that Bacchus and Osiris were the first who instructed men in the cultivation of the vine, and in drawing from it, its inspiring virtues. Noah planted a vineyard and the spies sent by Moses into the land of Canaan, started at the ripening of the first grapes; and in many places throughout the Sacred Volume, wine is mentioned in connection with its use and abuse. Many of the stories related by ancient writers in regard to this fruit have been deemed fabulous. It is stated in the Bible, that at the brook of Eschol a cluster was cut down and borne into camp by two men; but in modern times, we have authority for asserting that bunches have been found in the Valley of Hebron, so large that two men could scarcely carry one of them. The writings of Forster, Rosenmuller and Morden, would seem to confirm these statements.

Scarcely a writer of ancient times, passed the vine unnoticed, if nothing more than to extol the virtues of its fruit; but no systematic classification was attempted until modern times, when 170 species have been described, but owing to the want of an unfailing standard or criterion of specific identity, many varieties have been classed as species, and a careful revision of the family leaves but *seventy* distinct species. Although Europe is now the great land of the vine, it does not furnish a single native species.

India and Turkey furnish twenty-eight species as follows:—

Vitis bracteola, Wallich.
" cinnamomea, Wall.
" costata, Wall.
" fluminicola, Steund.
" gracillis, Wall.
" hederacea, Wall.
" indica, Linnæus.
" irawadyana, Steund.
" laeta, Wall.
" lanata, Roxburg.
" latifolia, Rox.
" mollissima, Wall.
Vitis novemfolia, Wall.
" obtecta, Wall.
" parvifolia, Rox.
" peduncularis, Wall.
" polystachya, Wall.
" purani, Hamill.
" rubifolia, Wall.
" rugosa, Wall.
" scabriuscula, Wall.
" semicordata, Wall.
" tomentosa, Heyn.
" tricophora, Wall.
" vinifera, Linnæus.

The Island of Jamacia furnishes the Vitis Caribæa, De Candolle.

Silket yields the Vitis Mollis, Wall.

Africa produces

Vitis africanus, Sprengel.
Vitis erythroides, Fresen.
Vitis hispida, Eckl.

Nepal produces

Vitis atroviridis, Wall.
" capreolata, Don.
Vitis glandulosa, Wall.
" Wallichii, Dec.

China produces

Vitis bryoniæfolia, Bunge.
Vitis ficifolia, Bunge.

Japan produces

Vitis flexuosa, Thunb.

Java produces

Vitis acymosa, Blume.
" heterophylla, Thunb.
Vitis javanica. Sprengel.
" sylvestris, Blum.
Vitis truncata, Thurnb.

The Vitis laciniosa (*Lin.*,) and the V. orientalis, (of Clem) are in dispute.

South America claims

Vitis blanda, Vahl.
" rubra, Desf.
Vitis sinuata, Don.
" tiliæfolia, Willd.

These names are generally applied to the above species, but their synonyms exceed three hundred names, which will not be recited in this article.

We will now pass to the North American species, and present their synonyms.

Vitis BIPINNATA, T & G.
“ AMPELOPSIS BIPINNATA, Mich.
“ CISSUS STANS, Persoon.
“ PULLARIA, Le Conte.
“ ARBOREA, Willd
“ BIPINNATA, Elliott.
“ INCISA. Nuttall.
“ INDIVISA, Willdenow.
ÆSTIVALIS, Elliott.
BRACTEALA, Raffinesque.
AMPELOPSIS CORDATA, Michaux.
CISSUS AMPELOPSIS, Persoon.
Vitis VULPINA, Willdenow.
CORDIFOLIA, Michaux.
CALLOSA, Raffinesque.
Vitis HYEMALIS, “
“ LABRUSCA, Linnæus.
“ LABRUSCOIDES, Muhlenb'g.
“ SYLVESTRIS, Bartram.
“ OCCIDENTALIS, “
“ VULPINA, Marshall.
“ CANINA, Raffinesque.
“ RUGOSA, “
“ FERRUGINEA, “
“ LATIFOLIA, “
“ LUTEOLA, Raffinesque.

Vitis BLANDA, “
“ PROLIFICA, “
“ OBOVATA, “
“ LABRUSCOIDES, “
“ TENUIFOLIA, Le Conte.
CISSUS TENUIFOLIA. “
Vitis ÆSTIVALIS, Michaux.
LABRUSCA Elliott.
ARANEOSA, of authors.
Vitis INTERMEDIA, Muhlenberg.
ÆSTIVALIS, Darlington,
BICOLOR, Le Conte.
Vitis RIPARIA, Michaux.
INCISA, Wallman.
Vitis ODORATISSIMA, Don.
RIPARIA, Torrey & Gray.
Vitus ROTUNDIFOLIA, Michaux.
VULPINA, Walter.
VERRUCOSA, Michaux.
ACERIFOLIA, Raffinesque
ANGULATA “
Vitis PALMATA, Vahl.
“ VIRGINIANA, Poir.
“ RUBRA, Desf.
“ CALIFORNICA, Benth.
“ RUPRESTRIS, Scheele.
“ CARIBÆA, Swartz.

Of these four are “*fox grapes*,” four “*chicken grapes*,” three “*summer grapes*,” four very small acidulous grapes, and one very thick skinned sweet grape.

The northern fox grape is the Vitis Labrusca, and is known by the common name of Schuylkill, Alexander, Tasker. Venango, Wyoming, Susquehanna, Bald Eagle, Catawissa, Muncy, Luffborough, Philadelphia, Poplar, Alleghany, and Dog grapes, and rusty, white, red, purple, blue and black fox grapes in Pennsylvania.

In New York they have Cattskill, Clifton, Powell, Mazzie, Utica, Lake and rugose grapes, and green, white, red and bland fox grape.

In Ohio they have Venango, Odd-leaf, River, Prairie, and Ohio grapes, and white, blue and black fox grapes.

In the south, they have Kentucky, Carolina, Huling, Alleghany, Ozark, Rockhouse, Indian, Sandhill, and purple plum grapes, and a host of other local names.

Then in addition to the above are the hybrid varieties, Catawba, Isabella, Concord, Diana, Garrigues, Hartford Prolific, Hudson, Hyde's Eliza, Louisa, Marion, To Kalon, Wymar, Union Village, Red Muncy, Raabe, Tokay, White Catawba, Mammoth Catawba, Clinton, Northern Muscadel, and Muscadine, Cape, Spring Mills, Constantia, Winne, Lyman, Charter Oak, Maxatawney, Rebecca, Weber's, Mary Ann, Cloanthe, Anna, Graham, Miner's Seedling, Canby's August, Brickle, Kingsessing, Wright's Isabella, Ive's Seedling, Kelvington and Burton's Early Harvest.

And the following, although American Seedlings, are believed to be from the Vitis vinifera:—Canadian Chief, Child's Superb, Jack grape, Segar box, Longworth's Ohio, Cassaday, Traminer, American Red Resling, Missouri, of Cincinnati, American Madiera, and American Sweet Water.

"The Fox grape of the South" is the VITIS *rotundifolia* of Mx., and is known by the names of Muscadine, Scuppernong, Bullace, Bull, Bullit, Roanoake, Old Virginia grapes, and red, white and black Fox grape.

There is another "Fox grape" in the South called the *Vitis* palmata, by Vahl, and VITIS *Virginiana* by Poiret. It is a common grape in Georgia, and presents many varieties. It is the "Old Bland's grape," and its seedlings are Bland's Virginia, Bland's pale red, Bland's Madeira, Red Scuppernong, Norton's Seedling, Powell, Elsinburg, Smart's Elsinburg, Herbemont, Neal's grape, Warrentown, Herbemont's Madeira, Lenoir, Missouri, Thurmond, Long's grape, Devereux and Columbia.

The fourth "Fox grape" is the VITIS *arenosa* found growing in Georgia and the Southwest. It is called in that region "Fox grape."

The VITIS *bicolor* is the Summer grape of the North, called by Darlington *Æstivalis*, and by Muhlenberg *intermedia*. Some of its varieties are exceeding fine. I planted a vine in my father's yard which I found on the banks of the Brandywine, in Chester Co., Pa., about twenty-five years ago, and many persons prefer its fruit to the Catawba which grows in the same yard. It is also called *fulva*, *sinuata*, *quinquilobia*, *heterophylla*, *triloba and media.* Among its common names Raccoon, Coral, Bear, Washita, White River, Red River and White Summer. Several of the finest cultivated varieties, are, perhaps seedlings, or hybridized by this species, such as the Delaware, Graham, Heath, Emily and Clara.

The summer grape of the South is V. æstvalis of Michx, and V. labrusca of Ell. It grows abundantly in Georgia and South Carolina. The fruit is as variable in size, taste and color as in the bicolor. It is there generally called the "Little Fox grape."

The winter grape of the North or the common "Chicken" grape, is the V. *vulpina* of Marshall, V. *cordifolia* of Will., in Gray's Botany of the Northern United States, V. *cordifolia* of Pursh, *vulpini* of Muhlenberg, V. *callosa* and V. *hyemalis* of Raffinesque. This grape is known by the name of Chicken, Frost, Winter, Canada late, Creeping, Dwarf, Ground, Blood of Missouri and Shot grape. It is variable in size, color and flavor. Several varieties are esteemed for drying for domestic purposes, but it is generally unpalatable and sour. Some varieties, however, are palatable.

The Southern Chicken grape is the V. *bipinnata* in Torrey and Gray, V. *arborea* Will., V. *pullaria* of Le Conte, *ampelopsis bipinnata* Michx, *cissus stans* of Pursh, and c. *bipinnata* of Ell. The berries are small and generally similar to the Northern varieties of the V. *vulpina,* Marsh, or V. *cordifolia* of Darlington.

The Vitis *odoratissimum* of Don. is the V. *riparia* of Michx, in Torrey and Gray. Its flowers emit a fragrance exactly like the mignonette which is delicious. It seldom perfects fruit. The berries are black, small and very sour; but its blossoms fill the air of our mountain valleys with the most delightful perfume.

The Vitis *riparia* of Michx, in the South, is known by the name of Pigeon grape, River grape, and along the Mississippi, *Vigne de battures.* I have met with this grape in Pennsylvania, growing in the vicinity of the V. *odoratissima,* and frequently compared them in all stages of their growth, and found strong lines of distinction in their botanical character. The fruit is small, black and very acidulous.

The Vitis *tenuifolia,* Will., produces a very small sour grape, and is found in the swamps of the extreme South.

This Vitis *Californica* of Bent. is found around Fort Reading in California, Sonora, Mexico, and at San Diego. It is now the California grape in cultivation, which yields the luscious and abundant crops about which we hear so much from that land of wealth and promise. Those grapes are varieties of the V. *vinifera,* introduced into that country by the missionaries and traders from other countries. The California grapes under cultivation are seedlings, and, perhaps, the original Madeira and White Muscata.

The *Vitis incisa* of Nuttall is found growing wild on the eastern slope of the Rocky mountains, from Arkansas to Texas, and as far west as the head waters of Red river. The fruit is about the size of a small pea, of a black, shining colour. It has not received much notice.

The *Vitis caribœa*, Swartz, is found in California. The fruit is about the size of a currant, and grows profusely on the very long vines of that plant.

The *Vitis rupestris* of Scheele, is found in Arizonia, Texas and San Diego. The fruit is said to be large, thin-skinned, juice saccharine, with well-developed vinous flavor.

Of the sixteen species found in the United States, six of them produce varieties yielding fruit of superior excellence when properly cultivated.

The cultivation of the foreign grapes commenced almost with the first settlement of the country.

In 1620, the "London Company" planted a vineyard in Virginia.

In 1632, Governor Winthrop planted a vineyard on Governor's Island in Boston harbor.

In 1640, some French settlers planted vineyards in Delaware.

In 1650, the Dutch planted vineyards on the Hudson.

In 1660, the French planted vineyards on the Illinois river.

In 1683, William Penn planted a vineyard near Philadelphia.

In 1697, the Jesuit Missionaries planted the famous *Vina Madre* in California.

In 1770, the Franciscan monks introduced the same vine into Upper California.

In 1804, the Swiss planted vineyards at Vevay, Indiana.

These foreign varieties were not adapted to the climate, soil and atmospherical conditions of this country—proved to be not remunerative, and were ultimately pretty nearly abandoned, except in California, where they improved in productiveness and character, and nothing can now exceed the California vineyards. "The ordinary calculation is, that an acre of land will produce a thousand gallons of wine annually. The crop is always abundant; it has never been known to fail." The varieties cultivated here are all foreign, and are called Alicante, White Muscatel and Madeira. The varieties cultivated in the eastern States do not succeed well in California and Oregon.

The varieties obtained from our native grapes possess their high excellence only in limited localities. A "very best" grape in one locality may be "poor" in another, as the following list will show.

In Massachusetts, the following are esteemed "*very best:*"

Delaware,
Concord,
Rebecca,
Diana,
Hartford Prolific.
To Kalon.

New York.

Herbemont,
Canby's August,
Diana,
Clinton,
Norton's Seedling,
Delaware.

Pennsylvania.

Clara,
Diana,
Cassiday,
Wright's Isabella,
Catawba,
Concord.

Ohio.

Catawba,
Clinton,
Delaware,
Diana,
Concord,
Shaker.

Virginia.

Isabella,
Warren,
Bland's Virginia,
Catawba,
Pauline,
Lenoir.

Georgia.

Isabella,
Scuppernong,
Lenoir,
Catawba,
Missouri,
Warren.

Missouri.

Little Ozark,
Ozark Seedling,
Missouri,
Waterloo,
Scuppernong,
Warren.

Since the grape is so readily hybridized, we may expect the number of good varieties to be increased every year, and careful experiment and study alone can determine the merits of these varieties. We may also anticipate an unreasonable anxiety to discover "very superior kinds," and the frequent announcements of new varieties of "extraordinary superiority;" but due allowance must be made for the fanciful imagination and the ambitions of those who labor under the influence of the vine. Grapes, superior to any now known, may, and very likely will be produced, and the list of first-rate grapes greatly extended. From twenty-one species in the old world, there are at least two thousand three hundred varieties. At the commencement of the present century one thousand four hundred varieties were collected and tested in the Luxembourg nursery in France, to determine the long disputed qualities of certain varieties. The grape appears to be more strongly influenced by different exposures, climate, soil, and other local circumstances, than any other fruit. "As a striking example of these effects, we may adduce the slopes of the hills which grow the wines of Montrachet. The insulated part towards the top furnishes the wine called "*Chevalier Montrachet*," which is less esteemed, and sells at a much lower price than the delicious wine grown on the middle height, called "*True Montrachet*." Beneath this district, and in the surrounding plains, the vines afford a far inferior article, called "*Bastard Montrachet*." The opposite side of the hill produces very different wines. Similar differences, in a greater or less degree, are observable relatively to the districts which grow the Pomard, Volnay, Beaune, Nuits, Vongeot, Chambertin, Ramanee, &c. Everywhere it is found that the reverse side of the hill, the summit and the plain although consisting of like soil, afford inferior wine to the middle southern slope. "*Ure's Dictionary*."

The principal part of the varieties tested in Luxembourg nursery were from the *Vitis vinifera*, and so gradually did they pass into one another, that the best grape connoisseurs could not detect the *true* varieties, and it seems to me to be a waste of time to attempt the identity of varieties produced from seeds, by the character of the fruit, for all our cultivated varieties being hybrids, every plant obtained from seed will present a different variety, although it may approach very nearly to some other variety.

METHODS OF PROPAGATING.

The best varieties can be propagated very readily by "eyes," "cuttings," and "layers." In February or March take the vines of last year's growth and cut them into shoots about two inches long, the *bud* or "eye" being in the middle. Use a sharp knife and cut slanting, diverging from the bud at bôth ends; have pots or boxes prepared with two or three inches of charcoal, limestone, or small stones in the bottom. Over this, place some moss or hay, and then fill up with nice fine garden mould. Plant the "eyes" uppermost in this mould, but a very little below the surface; keep the pots or boxes in a steady temperature of about 60° and the earth moist but not too wet. In about a month the eyes will have thrown off rotos and commenced growing, and in a short time they can be removed to other pots. By frequent repotting, several feet of growth may be obtained in a single year. The plants thus grown are the best for planting, being the best rooted. It is also said they form shorter joints, and produce better crops of fruit.

Cuttings.—The second plan is by "*cuttings.*" The best season to procure cuttings is in the fall after the wood has fully matured, but before the intensity of winter sets in; but they will often grow if taken off in February and March. The "cuttings" should be of last year's growth, of well ripened wood, and cut into lengths containing three or four buds. If a small portion of the preceding year's growth is obtained for the lower end it is better. Cut off the lower end smoothly, just under the bud and the upper end an inch or two above the bud. Cut in a slanting manner on the side opposite the bud to throw off the moisture. If cut in the fall or winter, the cuttings should be buried in a sheltered situation, where they will be protected from the severity of the frosts, and where they are to remain until the last of March or the beginning of April.

As soon as the ground is in good working order after the breaking up of winter, prepare your ground for your cuttings. If in the situation where they are to remain, a deep subsoiling and thorough drainage must be prepared. Dig a trench two and a half feet deep and fill it up one-half with limestone, old crockery, bricks, cinders, old bones, leather and other rubbish that accumulates around the farm, blacksmith shop, machine shop, limekilns, potteries or tan yard, and then fill up the trench with good soil; a sandy texture is preferable. In this, place your cuttings in a slanting position, the lower end from six to ten inches deep, and the upper end with the upper bud about two inches above the surface. The ground on the surface should be pressed closely around the cutting, and covered with leaves, litter or stones to prevent the surface from becoming hard and compact. Care must be taken to keep the ground moist by watering at least once a week. During the very warm weather, the cuttings should be partly sheltered from the severity of the sun's rays, and from the drying winds. If the cuttings are raised for transplanting, pretty much the same rules must be observed as given. When they are to remain permanently, they must in all cases be kept perfectly clean of weeds and grass, and the soil must be kept moist and free from baking.

The third mode of propagation is by "*layers,*" a very expeditious mode of growing vines although it is not regarded as the best. One plan of obtaining vines by this method is in March or April to run the vine through the bottom of a box or pot and let two or three buds come above the top. Put in the bottom of the pot or box, some leaves, and then fill it with rich garden mould, and water every day. The success of this method depends on keeping the mould in the pots moist. The plant should be separated from the vine in September, and planted where it is to remain. Another mode by layers is to bend the vine down and fasten it there with a peg. Make a cut half way through the under side of the shoot below some of the buds, then cover the vines with fine mould to the depth of three or four inches, and cover the surface with leaves, straw or some mulch to keep the ground moist. This operation may be performed at any time up to the middle of July, and is usually attended with success. The vines should be separated in the following spring.

The grape is also propagated by grafting. Root grafting is usually performed in very early spring, before the sap moves. The other modes of grafting are usually performed after the vine is in leaf. I will not enter into a scientific disquisition on grafting, but merely state that almost every mode of grafting is successfully practised on the grape vine, though more care is requisite than is usually practiced on the pear or apple, owing to the liability of the grape vine to "*bleed.*" The best time to perform the operation is when the sap is not in active motion. By these means, the best varieties of grapes may soon be increased to a great extent, and there is no apology for encumbering the ground with poor and insipid varieties. Every dwelling should posses a grape vine of the best variety.

The modes of *culture, pruning and management*, are subjects of as much discussion as the recognition of the varieties. Theory being often founded on false deductions, fails in practice. Science, not theory, and practical experiments must be brought together, and men of science should work more and theorize less, and not dignify mere theories with the name of horticultural science. Vegetable physiology is but little understood, and writers attempt an exposition of many of the intricacies of phytology without even comprehending the simplest laws of vegetable life. Many species of the grape vine differ materially in their native growth, soil and climate. Some are mere shrubs, whilst others clamber to the top of the highest trees and cover an immense area. Some delight in limestone soils whilst others grow in the almost barren sands of the sea coast, and others again flourish and perfect their fruit at the foot of the glaciers, or along the shores of our northern lakes, whilst still others delight in the sultry miasmas of the swamps of Georgia and Florida.

The vineyards of France are not objects of much beauty. "Before the foliage of the plants has made its appearance, nothing but a field of stakes about four feet high is visible." "It looks like currant bushes, or any low and leafless shrubs," whilst in Italy the same varieties of vines are trained to elms, poplars and maples and are permitted to clamber to their tops and spread from tree to tree crossing in all directions, and the fruit too hangs in beautiful clusters and festoons, and give to the Italian vineyards all the beauty and taste described by travellers as they

"Scent the new fragrance of the breathing rose
And quaff the pendant vintage as it grows."

Many of our American vines are great ramblers. I have seen varieties of the Fox grape on the north and a humid soil. Guano is an excellent manure for the grape vine, and next to this is the manure from the hog-pen and chicken-house. To promote the growth of the vine, keep the ground well mulched; but to ripen the fruit, the gases should be allowed to escape freely and the surface exposed to the sun. The ground should not be dug up so as to injure the roots that are found near the surface If the ground is continually disturbed to the depth of the spade, so as to damage the roots, and in addition, is kept wet and covered, the fruit will very likely rot.

It is impossible in an article of the limit prescribed, to enter into all the whys and wherefores of the grape culture, for it is involved in almost every question of Life with its Conditions, and embraces many of the intricacies of vegetable physiology and agricultural chemistry. I have, therefore been compelled to closely prune my position, and perhaps, in some instances, to leave my subject in the dark, but, if I have advanced anything that will contribute to the propagation of this most excellent fruit, I have accomplished my object. I confidently anticipate the complete success of the American grape, both as a table fruit and for wine, and I think nothing now remains but to clear away the rubbish, and adopt the best varieties; reject the inferior ones, and give the best attention and care that the grape of the old world has received since the primitive days of our venerable ancestors.